IN THE CLAIMS:

1. (Currently Amended) ~~Biochemical~~ A biochemical sensor system with molecular amplification of a signal for detecting and analysing a biological entity in a biotic medium, said biological entity being identifiable by at least an elementary strand including a specific nucleotide sequence, said sensor having at its surface a directly or indirectly immobilised detection unit, said detection unit having a complementary nucleotide sequence to that of the biological entity, and said sensor surface being arranged to supply to a detection and measuring ~~means~~ device a signal representative of the variation in ~~a physical parameter~~ mass via hybridisation of the biological entity with the detection unit, characterised in that the biotic medium contains monomer compounds and catalytic units ~~are added to the biotic medium, said catalytic units being capable of catalysing~~which catalyze, from the end of an elementary strand of the biological entity, a polymeric concatenation of said monomer compounds thus locally increasing a physical parameter which can be measured at the sensor surface.

2. (Currently Amended) Sensor system according to claim 1, characterised in that said physical parameter which can be measured is ~~mass,~~ absorption of a light wave or emission of a fluorescence signal.

3. (Original) Sensor system according to claim 1, characterised in that the catalytic units are enzymes selected from among transferases, polymerases and synthetases.

4. (Currently Amended) Sensor system according to claim 3, characterised in that the enzymes are added to the biotic medium by selecting a single kind of enzyme, by combining several ~~classes~~ kinds or by adding several kinds sequentially.

5. (Currently Amended) Sensor system according to claim 3, characterised in that the enzyme is a DNA strand transferase, such as a transferase at the end ~~3'~~(3'), or an RNA strand polymerase.

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6. (Previously Amended) Sensor system according to claim 3, characterised in that the biological entity is a peptide or a protein and in that the enzyme is a peptided synthetase.

7. (Original) Sensor system according to claim 4, characterised in that the biological entity is a di- or oligo-saccharide and in that the sequentially added enzymes include a mono- or oligo-saccharide transferase.

8. (Previously Amended) Sensor system according to claim 1, characterised in that the monomer compounds are selected from among nucleotides and oligonucleotides.

9. (Previously Amended) Sensor system according to claim 1, characterised in that the sensor surface has a waveguide or waveguide gradient arrangement allowing optical detection of the refractive index variation, linked to the variation in mass at the sensor surface, this refractive index variation being able to be correlated with the analysis of the biochemical entity.

10. (Previously Amended) Sensor system according to claim 1, characterised in that the monomer compounds are labelled with a chromophor or a fluorophor allowing an absorption or

fluorescence measurement to be made which can be correlated with the analysis of the biochemical entity.

11. (Previously Amended) Sensor system according to claim 1, characterised in that the sequence of nucleotides forming the detection unit is directly linked to the surface of the sensor by a covalent link.

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12. (Currently Amended) Sensor system according to claim 1, characterised in that the detection unit is linked in a one-directional manner by its end ~~3' or 5'~~ (3' or 5').

13. (Previously Amended) Sensor system according to claim 1, characterised in that the nucleotide sequence forming the detection unit is linked to the surface of the sensor by photo-immobilisation.

14. (Previously Amended) Sensor system according to claim 1, characterised in that the nucleotide sequence forming the detection unit is indirectly linked to the sensor surface by a bi-functional scaffold, which is itself linked to said surface by a docking unit.

15. (Currently Amended) Sensor system according to claim 14, characterised in that the compounds allowing the scaffold to be formed are selected from among~~,~~ a bi-functional molecular entity~~, such as a hetero bi-functional cross linking agent~~, an antibody modified by a nucleotide or one of its fragments, DNA dendrimers of suitable size, and metal or semiconductor nanocrystalline compound colloids.

16. (Original) Sensor system according to claim 14, characterised in that the compounds allowing the docking unit to be formed are selected from among immunogloblins, protein A, protein G and amalgamated protein A-G.

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17. (Original) Sensor system according to claim 14, characterised in that the compounds allowing the docking unit to be formed are selected from among avidine, neutravidine, streptavidine and DNA or RNA oligonucleotides occupying a quarter of the biotin link sites.

18. (Original) Sensor system according to claim 14, characterised in that the compounds allowing the docking unit to be formed are selected from among a labelled polyhistidine and a labelled nitroacetate.

19. (Original) Sensor system according to claim 14, characterised in that the docking unit is formed by an oligonucleotide having a partially complementary nucleotide sequence to one of the branches of a dendrimer when the molecular structure has a dendrimer architecture.

20. (New) Sensor system according to claim 15, characterized in that the bi-functional molecular entity is a hetero-bi-functional cross linking agent.